From Octahedron to Sphere: A Unified Framework for Early Universe Geometry, Quantum Gravity, and Mathematical Constants. New possible mathematical connections with the Ramanujan Recurring Numbers and some parameters of Number Theory, Theoretical Physics, Cosmology and String Theory

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Abstract

The evolution of the early universe can be understood through transformations between fundamental geometric shapes, specifically from an octahedron to a sphere. This paper presents a unified framework for analyzing these transformations using the Del Gaudio-Nardelli (DN) Constant, a ratio derived from the volumes of an octahedron and a sphere.We explore the mathematical connections between the DN Constant, Ramanujan's recurring numbers, and key principles of String Theory and Number Theory. Our analysis provides insights into how these geometric transformations reflect underlying quantum gravity phenomena, such as the evolving quantum vacuum and matter creation. The study highlights the use of modular equations and mathematical constants like π and ϕ to deepen our understanding of the universe's structure during its formative phases. Additionally, we discuss how this framework may contribute to the ongoing effort to unify Loop Quantum Gravity and String Theory, bridging gaps in current cosmological models.

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Srinivasa Ramanujan

(1887 - 1920)

Introduction

In this paper, an octahedron could serve as a mathematical or conceptual model of the universe in the quantic phase, while the spherical surface could be used to describe the geometry of the bubble-universe.

The values $(2\sqrt{2})/\pi$, the golden ratio φ, $\zeta(2)$ and π, can be connected to the proposed cosmological model. Here's how they might be connected:

Ratio $(2\sqrt{2})/\pi$ the so called DN Constant:

This relationship may have a connection with the geometric properties of the octahedron and the sphere, which have been considered as mathematical models of the early universe and bubbles universe in eternal inflation.

Golden Ratio φ:

The golden ratio is a mathematical constant that appears in many natural and artistic contexts and is often associated with harmonious proportions and aesthetic beauty. Its emergence in this context could suggest a kind of intrinsic symmetry or harmony in the structure of the early universe and bubbles universe.

Value of π:

The value of π is a fundamental mathematical constant that appears in many geometric formulas and relationships, including the geometry of the sphere. Its appearance could indicate a direct connection between the geometry of bubbles universe and the mathematical properties of spherical surfaces.

Ultimately, the results obtained can be interpreted as manifestations of the geometric and mathematical properties of the models proposed for the early universe and universe bubbles. This suggests that there is a profound connection between geometry, mathematics and cosmological physics, and that through the analysis of these relationships we can deepen our understanding of the universe and its fundamental phenomena.

The above values (2√2)/π, the golden ratio φ and π, can be connected to the proposed cosmological model. This hypothesis is certainly plausible.

The various mathematical solutions and relationships can be seen as representations of the principles and laws that govern the formation and evolution of the universe.

Regarding the fundamental mathematical values, they could emerge as a consequence of the geometric and physical laws that govern the structure and evolution of the quantum universe and bubbles universe.

The multidisciplinary approach involving complex mathematical solutions and cosmological concepts can offer deeper insight into the fundamental nature of the universe and its processes. Exploring these connections could lead to new discoveries and insights into our understanding of the early universe and its complexity.

Proposal:

The initial octahedron: Let's imagine a regular octahedron, with perfectly symmetrical faces. Each face represents an ideal symmetry.

The emerging sphere: Inside the octahedron, there is an inscribed sphere. This sphere represents the bubble of the universe that emerges from the perturbations of the quantum vacuum during eternal inflation.

Expansion and transitions: As time passes, the universe expands. The faces of the octahedron begin to break, symbolizing "symmetry breaks." The sphere continues to grow, representing the expanding universe.

Constants and numbers: We integrate the mathematical results you obtained. For example, the golden ratio (φ) could be represented by a proportion between the dimensions of the octahedron and the sphere.

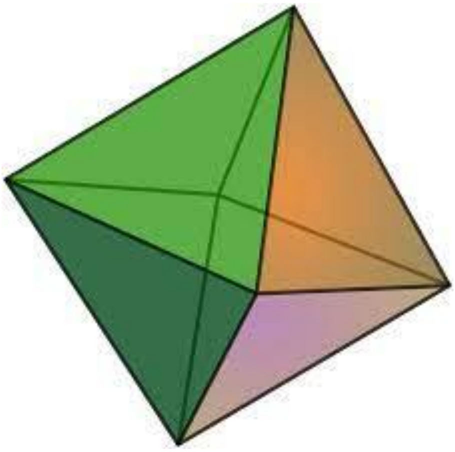
Entropy and complexity: Entropy increases as the universe evolves. We can represent this with a disordered growth of structures within the emerging sphere. Imagine this scene as an abstract work of art, where geometric shapes and cosmological concepts merge

In Fig.1 and Fig.2 let's imagine a regular octahedron representing the universe in its phase of high symmetry and very low entropy. Inside the octahedron we have an inscribed sphere that emerges from perturbations of the quantum vacuum during eternal inflation. As time passes, the universe expands, the faces of the octahedron break (symmetry breaks), and entropy increases. Spheres emerge from the octahedra, symbolizing the transition phases from a regime of very low entropy to a universe in which, with the passage of time, entropy increases, increasing the complexity of the universe itself.

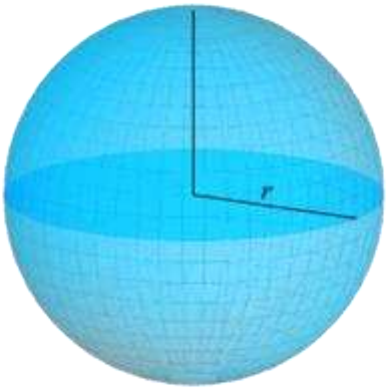
Fig. 1

Fig. 2

Now, we have that:



Octahedron



Sphere

From the octahedron volume $V = 1/3*\sqrt{2}\ l^3$ and, from the sphere volume,

$V = (4/3*\pi*r^3)$, we consider the following relationship, for $r = x$:

4/3*π*x^3 = 1/3*√2*l^3

Input

$$\frac{4}{3}\pi x^3 = \frac{1}{3}\sqrt{2}\,l^3$$

Exact result

$$\frac{4\pi x^3}{3} = \frac{\sqrt{2}\,l^3}{3}$$

Alternate forms

$$x^3 = \frac{l^3}{2\sqrt{2}\,\pi}$$

$$\frac{4\,\pi\,x^3}{3} - \frac{\sqrt{2}\;l^3}{3} = 0$$

Real solution

$$x = \frac{(-1)^{2/3}\,l}{\sqrt{2}\;\sqrt[3]{\pi}}$$

Solutions

$$x = -\frac{\sqrt[3]{-\frac{1}{\pi}}\;l}{\sqrt{2}}$$

,

$$x = \frac{l}{\sqrt{2}\;\sqrt[3]{\pi}}$$

,

$$x = \frac{(-1)^{2/3}\,l}{\sqrt{2}\;\sqrt[3]{\pi}}$$

Integer solution

$l = 0, \quad x = 0$

Implicit derivatives

$$\frac{\partial x(l)}{\partial l} = \frac{l^2}{2\sqrt{2}\;\pi\,x^2}$$

$$\frac{\partial l(x)}{\partial x} = \frac{2\sqrt{2}\;\pi\,x^2}{l^2}$$

From the alternate form

$$x^3 = \frac{l^3}{2\sqrt{2}\,\pi}$$

$$x = \frac{l}{\sqrt{2}\,\sqrt[3]{\pi}}$$

for l = 8, we have that:

8/(sqrt(2) π^(1/3)) = 8/(2sqrt2 * Pi)^1/3

Input

$$\frac{8}{\sqrt{2}\,\sqrt[3]{\pi}} = \frac{8}{\sqrt[3]{2\sqrt{2}\,\pi}}$$

Result

True

Logarithmic form

$$\log_{\sqrt{2}\,\sqrt[3]{\pi}}(8) - \log_{\sqrt{2}\,\sqrt[3]{\pi}}\left(\sqrt{2}\,\sqrt[3]{\pi}\right) = \log_{\sqrt{2}\,\sqrt[3]{\pi}}(8) - \log_{\sqrt{2}\,\sqrt[3]{\pi}}\left(\sqrt[3]{2\sqrt{2}\,\pi}\right)$$

$\log_b(x)$ is the base- b logarithm

Thence:

l/(sqrt(2) π^(1/3)) = l/(2sqrt2 * Pi)^1/3

Input

$$\frac{l}{\sqrt{2}\,\sqrt[3]{\pi}} = \frac{l}{\sqrt[3]{2\sqrt{2}\,\pi}}$$

Logarithmic form

$$\log_{\sqrt{2}\,\sqrt[3]{\pi}}(l) - \log_{\sqrt{2}\,\sqrt[3]{\pi}}\left(\sqrt{2}\,\sqrt[3]{\pi}\right) = \log_{\sqrt{2}\,\sqrt[3]{\pi}}(l) - \log_{\sqrt{2}\,\sqrt[3]{\pi}}\left(\sqrt[3]{2\sqrt{2}\,\pi}\right)$$

$\log_b(x)$ is the base- b logarithm

Now, we have that:

l/(2 sqrt(2) π)^(1/3) = (2sqrt2)/Pi

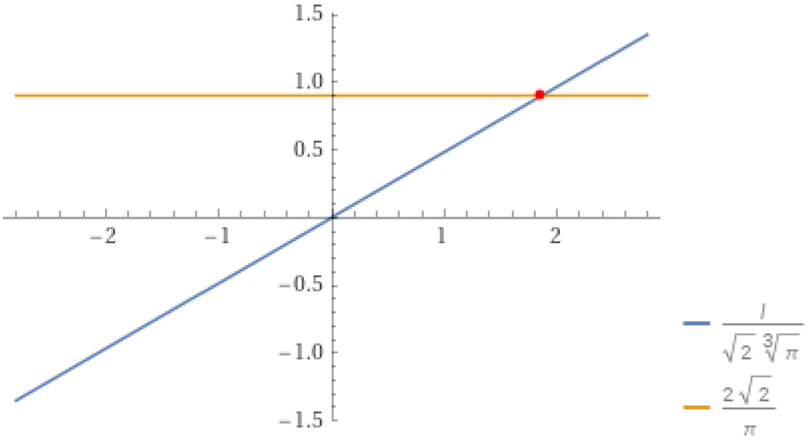
Input

$$\frac{l}{\sqrt[3]{2\sqrt{2}\,\pi}} = \frac{2\sqrt{2}}{\pi}$$

Exact result

$$\frac{l}{\sqrt{2}\,\sqrt[3]{\pi}} = \frac{2\sqrt{2}}{\pi}$$

Plot



Solution

$$l = \frac{4}{\pi^{2/3}}$$

$$l = \frac{4}{\sqrt[3]{\pi^2}}$$

What is the DN constant (Del Gaudio-Nardelli constant)?

The DN constant (Del Gaudio-Nardelli constant) is a mathematical concept derived from the ratio of the volume of an octahedron to the volume of a sphere. This constant has intriguing implications in various fields such as geometry, number theory, and cosmology.

Michele Nardelli and his collaborators have proposed that the DN constant could be fundamental to understanding the early universe, particularly in the context of eternal inflation. The octahedron represents a highly symmetric, low-entropy phase of the universe, while the sphere represents the universe emerging from the quantum vacuum, increasing in entropy over time.

The DN constant also connects to other significant mathematical constants such as pi, the golden ratio, and some values from number theory, suggesting a deeper unification of mathematical concepts and potentially offering insights into quantum gravity.

The implications of the DN constant in cosmology are quite fascinating. It plays a role in understanding the structure and evolution of the universe, particularly in the context of eternal inflation.

Eternal inflation

Eternal inflation is a theory that suggests that the universe is continually expanding exponentially. In this context, the DN constant helps describe the transition from a highly symmetric, low-entropy state (represented by the octahedron) to a more complex, high-entropy state (represented by the sphere). This transition is key to understanding how the universe evolves from a quantum vacuum to its current state.

Quantum gravity

The DN constant also has potential implications for quantum gravity, a field that seeks to unify general relativity and quantum mechanics. By connecting geometric shapes such as the octahedron and the sphere, the DN constant could offer insights into the structure of spacetime at the smallest scales.

Mathematical unification

Furthermore, the relationship of the DN constant to other mathematical constants such as pi and the golden ratio suggests a deeper unification of mathematical principles. This unification could provide new ways to address problems in cosmology, such as the nature of dark matter and dark energy.

Early Universe

In the early universe, the DN constant could help explain the initial conditions that led to the Big Bang. By understanding the geometric and entropic properties of the initial state of the universe, cosmologists can better model its subsequent expansion and structure formation.

The DN constant (Del Gaudio-Nardelli constant) plays a significant role in the theory of eternal inflation, which is a model of the exponential expansion of the universe. Here are some key points about its role:

Geometric representation

The DN constant is derived from the ratio of the volume of an octahedron to the volume of a sphere. In the context of eternal inflation, this geometric relationship helps describe the transition from a highly symmetric, low-entropy state (octahedron) to a more complex, high-entropy state (sphere). This transition is critical to understanding how the universe evolves from a quantum vacuum to its current state.

Entropy and symmetry

Eternal inflation implies that the universe is continually expanding and creating new regions of space. The DN constant helps quantify the change in entropy and symmetry during this process. The octahedron represents a low-entropy phase, while the sphere represents a high-entropy phase, illustrating the progression of the universe toward greater complexity.

Quantum fluctuations

In eternal inflation, quantum fluctuations play a critical role in driving the exponential expansion of the universe. The DN constant can be used to model these fluctuations, providing insights into how different regions of the universe evolve over time. This helps explain why some regions stop inflating and form "pocket universes", while others continue to expand.

Cosmological implications

The relationship of the DN constant to other mathematical constants suggests a deeper unification of mathematical principles, which could offer new ways to approach problems in cosmology. This includes understanding the nature of dark matter and dark energy, as well as the initial conditions that led to the Big Bang.

Fractal structure

Eternal inflation leads to a fractal-like structure of the universe, with countless "pocket universes" forming within the inflating space. The DN constant helps describe the geometric and entropic properties of these pocket universes, providing a framework for understanding their formation and evolution.

The DN constant (Del Gaudio-Nardelli constant) has interesting connections with quantum fluctuations, which are temporary changes in energy at a point in space due to the uncertainty principle.

Quantum fluctuations

Quantum fluctuations are tiny, random changes in the values of fields representing elementary particles, such as electric and magnetic fields. These fluctuations are a fundamental aspect of quantum mechanics and play a crucial role in the behavior of the universe at the smallest scales.

Relation to the DN constant

Geometric interpretation: The DN constant, derived from the ratio of the volume of an octahedron to the volume of a sphere, can be used to model the geometric properties of space during quantum fluctuations. This helps to understand how different regions of space evolve over time during the process of eternal inflation.

Entropy and symmetry: Quantum fluctuations contribute to entropy and symmetry changes in the universe. The DN constant helps quantify these changes, providing a framework for understanding, as we discussed earlier, the transition from a low-entropy, highly symmetric state (octahedron) to a high-entropy, less symmetric state (sphere).

Energy distribution: During eternal inflation, quantum fluctuations cause variations in the distribution of energy in different regions of space. The DN constant can be used to describe these variations, providing insights into how energy is distributed and how it affects the formation of structures in the universe.

Fractal structure: The fractal structure of the universe, resulting from eternal inflation, is influenced by quantum fluctuations. The DN constant helps describe the geometric and entropic properties of these fractal structures, helping to understand their formation and evolution.

By connecting geometric shapes and quantum fluctuations, the DN constant provides a deeper understanding of the behavior of the universe at both the macroscopic and microscopic scales.

DN Constant and Ramanujan Recurring Numbers

The DN constant (Del Gaudio-Nardelli constant) and Ramanujan recurring numbers are linked through their profound mathematical properties and implications in number theory and geometry.

DN Constant

The DN constant is derived from the ratio of the volume of an octahedron to the volume of a sphere. This constant has significant implications in various fields, including cosmology and quantum mechanics, as it helps describe transitions between different states of the universe.

Ramanujan's recurring numbers

Ramanujan's recurring numbers are a set of numbers that appear frequently in his work and have special properties. Some of these numbers include:

1729: Known as the Hardy-Ramanujan number, it is the smallest number that can be expressed as the sum of two cubes in two different ways.

4096: A power of 2, which appears frequently in Ramanujan's work.

π (pi): The ratio of the circumference of a circle to its diameter. 1.644934: The value of the Riemann zeta function of 2, also known as ζ(2).

φ (the golden ratio): Approximately 1.6180339887, it appears in various geometric and natural phenomena.

Connections

Geometric and number theory connections: The constant DN and Ramanujan's recurring numbers are related through their geometric and number theory properties. For example, the relationship of the constant DN to the volumes of geometric shapes can be linked to the properties of numbers such as π and φ, which are fundamental to geometry.

String theory and quantum mechanics: Both the constant DN and Ramanujan recurring numbers have applications in advanced fields such as string theory and quantum mechanics. These connections help us understand the fundamental nature of the universe, including the behavior of particles and the structure of spacetime.

Mathematical unification: The study of these constants and numbers often leads to a deeper unification of mathematical principles. For example, the relationship of the constant DN to geometric shapes and Ramanujan numbers can provide new insights into the solutions of complex equations in number theory and physics.

DN Constant extended

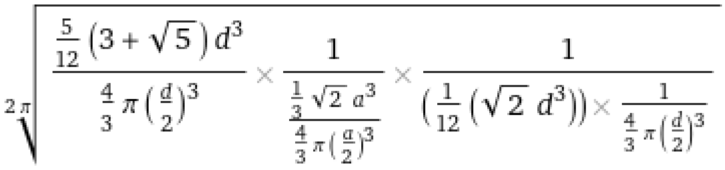
We have the following expression concerning the ratios (and/or the inverses) between the icosahedron, octahedron and tetrahedron volumes and the sphere volume.

$$\sqrt[2\pi]{\frac{\frac{5}{12}(3+\sqrt{5})d^3}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}\times\frac{1}{\frac{\frac{1}{3}\sqrt{2}a^3}{\frac{4}{3}\pi\left(\frac{a}{2}\right)^3}}\times\frac{1}{\frac{\sqrt{2}}{12}d^3\cdot\frac{1}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}}}$$

(we have highlighted the DN Constant in blue)

(((((5/12*(3+√5)*d^3)/(4/3*π*(d/2)^3))*1/((1/3*√2*a^3)/(4/3*π*(a/2)^3)) *1/((((√2 d^3)/12))*1/(4/3*π*(d/2)^3)))))^(1/(2π))

Input



$$\sqrt[2\pi]{\frac{\frac{5}{12}\left(3+\sqrt{5}\right)d^3}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}\times\frac{1}{\frac{\frac{1}{3}\sqrt{2}\,a^3}{\frac{4}{3}\pi\left(\frac{a}{2}\right)^3}}\times\frac{1}{\left(\frac{1}{12}\left(\sqrt{2}\,d^3\right)\right)\times\frac{1}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}}}$$

Exact result

$$2^{-1/\pi}\sqrt[2\pi]{5\left(3+\sqrt{5}\right)\pi}$$

Decimal approximation

1.6180085459001070581002623979536005212943435960226956084921288971

…

1.6180085459…. result that is a very good approximation to the value of the golden ratio 1.618033988749… (Ramanujan Recurring Number)

Alternate form

$$2^{-1/\pi}\sqrt[2\pi]{\left(15+5\sqrt{5}\right)\pi}$$

Series representations

$$\sqrt[2\pi]{\frac{5\left(3+\sqrt{5}\right)d^3}{\frac{\left(\left(\sqrt{2}\,a^3\right)\left(\sqrt{2}\,d^3\right)\right)12\left(4\pi\left(\frac{d}{2}\right)^3\right)}{\frac{\left(\left(3\left(4\pi\left(\frac{a}{2}\right)^3\right)\right)\left(12\left(4\pi\left(\frac{d}{2}\right)^3\right)\right)\right)3}{3\times 3}}}} = \sqrt[2\pi]{\frac{5}{2}}\,\sqrt[2\pi]{\frac{\pi\left(3+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)}{\sqrt{z_0}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)^2}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$\sqrt[2\pi]{\frac{5\left(3+\sqrt{5}\right)d^3}{\frac{\left(\left(\sqrt{2}\ a^3\right)\left(\sqrt{2}\ d^3\right)\right)12\left(4\pi\left(\frac{d}{2}\right)^3\right)}{\frac{\left(\left(3\left(4\pi\left(\frac{a}{2}\right)^3\right)\right)\left(12\left(4\pi\left(\frac{d}{2}\right)^3\right)\right)\right)3}{3\times 3}}}} =$$

$$\sqrt[2\pi]{\frac{5}{2}}\ \sqrt[2\pi]{\frac{\pi\left(3+\exp\left(i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}{\exp^2\left(i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2}}$$

for $(x \in \mathbb{R}$ and $x < 0)$

$$\sqrt[2\pi]{\frac{5\left(3+\sqrt{5}\right)d^3}{\frac{\left(\left(\sqrt{2}\ a^3\right)\left(\sqrt{2}\ d^3\right)\right)12\left(4\pi\left(\frac{d}{2}\right)^3\right)}{\frac{\left(\left(3\left(4\pi\left(\frac{a}{2}\right)^3\right)\right)\left(12\left(4\pi\left(\frac{d}{2}\right)^3\right)\right)\right)3}{3\times 3}}}} =$$

$$\sqrt[2\pi]{\frac{5}{2}}\left(\left(\pi\left(\frac{1}{z_0}\right)^{-\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor}\left(3+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\right.\right.\right.$$

$$\left.\left.\left. z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}\right)\right)\right/$$

$$\left.\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}\right)^2\right)\hat{}\left(\frac{1}{2\pi}\right)$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

i is the imaginary unit

Integral representation

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

$\Gamma(x)$ is the gamma function

$\mathrm{Re}(z)$ is the real part of z

$|z|$ is the absolute value of z

Furthermore, from the formula

$$2^{-1/\pi}\sqrt[2\pi]{5\left(3+\sqrt{5}\right)\pi}$$

we obtain also:

(4 (1.6180085459)^(2 π))/(5 (3 + sqrt(5))) = 3.1415926535

Indeed:

$$\frac{4\times 1.6180085459^{2\pi}}{5\left(3+\sqrt{5}\right)}$$

3.1415926535884871624221932509858715278931025189245576170078100613

...

3.1415926535…. = π (Ramanujan Recurring Number)

From the above expression, we obtain the following formulas concerning the icosahedron, octahedron and tetrahedron volumes together to the sphere volume.

$$\sqrt[2\pi]{\frac{5}{12}(3+\sqrt{5})d^3\times\left(\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\right)^2}$$

((5/12 (3+√5) d^3)×((4/3 π(d/2)^3)^2))^(1/(2Pi))

And

$$\sqrt[2\pi]{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\times\frac{1}{3}\sqrt{2}d^3\times\frac{\sqrt{2}}{12}d^3}$$

((4/3 π(d/2)^3)×(1/3 √2 d^3)×(√2/12 d^3))^(1/(2Pi))

Multiplying each equation by ((5/12 (3+√5) d^3)×((4/3 π(d/2)^3)^2))^(1/(2Pi))

and ((4/3 π(d/2)^3)×(1/3 √2 d^3)×(√2/12 d^3))^(1/(2Pi)) , we obtain, as described in the calculations, the golden ratio and π

Indeed, we obtain:

((5/12 (3+√5) d^3×(4/3 π(d/2)^3)^2)^(1/(2Pi)))/((4/3 π(d/2)^3×1/3 √2 d^3×√2/12 d^3)^(1/(2Pi)))

Input

$$\frac{\sqrt[2\pi]{\frac{5}{12}\left(3+\sqrt{5}\right)\left(d^3\left(\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\right)^2\right)}}{\sqrt[2\pi]{\frac{4}{3}\left(\pi\left(\frac{d}{2}\right)^3\times\frac{1}{3}\right)\sqrt{2}\left(d^3\times\frac{\sqrt{2}}{12}\right)d^3}}$$

Exact result

$$2^{-1/\pi}\sqrt[2\pi]{5\left(3+\sqrt{5}\right)\pi}$$

Decimal approximation

1.6180085459001070581002623979536005212943435960226956084921288971

…

1.618008545900107…. result that is a very good approximation to the value of the golden ratio 1.618033988749… (Ramanujan Recurring Number)

Alternate form

$$2^{-1/\pi}\sqrt[2\pi]{\left(15+5\sqrt{5}\right)\pi}$$

Series representations

$$\frac{\sqrt[2\pi]{\frac{1}{12}\left(\left(3+\sqrt{5}\right)\left(d^3\left(\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\right)^2\right)\right)5}}{\sqrt[2\pi]{\frac{\left(4\sqrt{2}\left(\left(d^3\sqrt{2}\right)d^3\right)\right)\pi\left(\frac{d}{2}\right)^3}{(3\times 12)\,3}}}=$$

$$\sqrt[2\pi]{\frac{5}{2}}\left(d^9\,\pi\sqrt{z_0}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}\right)^2\right)^{-1/(2\pi)}\sqrt[2\pi]{d^9\,\pi^2\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$\frac{\sqrt[2\pi]{\frac{1}{12}\left(\left(3+\sqrt{5}\right)\left(d^3\left(\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\right)^2\right)\right)5}}{\sqrt[2\pi]{\frac{\left(4\sqrt{2}\left(\left(d^3\sqrt{2}\right)d^3\right)\right)\pi\left(\frac{d}{2}\right)^3}{(3\times12)\,3}}}=$$

$$\frac{\sqrt[2\pi]{\frac{5}{2}}\left(d^9\pi\exp^2\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)^{-1/(2\pi)}}{\sqrt[2\pi]{d^9\pi^2\left(3+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}}$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$\frac{\sqrt[2\pi]{\frac{1}{12}\left(\left(3+\sqrt{5}\right)\left(d^3\left(\frac{4}{3}\pi\left(\frac{d}{2}\right)^3\right)^2\right)\right)5}}{\sqrt[2\pi]{\frac{\left(4\sqrt{2}\left(\left(d^3\sqrt{2}\right)d^3\right)\right)\pi\left(\frac{d}{2}\right)^3}{(3\times12)\,3}}}=\sqrt[2\pi]{\frac{5}{2}}$$

$$\left(d^9\pi\left(\frac{1}{z_0}\right)^{\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1+\lfloor\arg(2-z_0)/(2\pi)\rfloor}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)^2\right)^{-1/(2\pi)}$$

$$\left(d^9\pi^2\left(3+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right){}^\wedge\left(\frac{1}{2\pi}\right)$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

i is the imaginary unit

From the following extended DN Constant ("Unitary Formula")

$$\sqrt[2\pi]{\frac{\frac{5}{12}\left(3+\sqrt{5}\right)d^3}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}\times\frac{1}{\frac{\frac{1}{3}\sqrt{2}a^3}{\frac{4}{3}\pi\left(\frac{a}{2}\right)^3}}\times\frac{1}{\frac{\sqrt{2}}{12}d^3\cdot\frac{1}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}}}\times\sqrt[3]{-\frac{q}{2}+\sqrt{\frac{q^2}{4}+\frac{p^3}{27}}}+\sqrt[3]{-\frac{q}{2}-\sqrt{\frac{q^2}{4}+\frac{p^3}{27}}}$$

with regard

$$\sqrt[3]{-\frac{q}{2}+\sqrt{\frac{q^2}{4}+\frac{p^3}{27}}}+\sqrt[3]{-\frac{q}{2}-\sqrt{\frac{q^2}{4}+\frac{p^3}{27}}}$$

for q = 1729 and p = 4096, we obtain by changing the sign in the algebraic sum of the aforementioned Cardano's Formula and after some calculations:

$$2^{-1/\pi}\sqrt[2\pi]{5\left(3+\sqrt{5}\right)\pi}$$

multiplied by

$$\sqrt[9]{\sqrt[3]{-\frac{1729}{2}+\sqrt{\frac{1729^2}{4}+\frac{4096^3}{27}}}-\sqrt[3]{-\frac{1729}{2}-\sqrt{\frac{1729^2}{4}+\frac{4096^3}{27}}}}$$

and performing the ninth root of the entire expression:

√((2^(-1/π)(5(3+√(5))π)^(1/(2π)))((∛(-1729/2+√(1729^2/4+4096^3/27)) -∛(-1729/2-√(1729^2/4+4096^3/27)))^1/9))

we obtain:

$$\sqrt{\left(\left(2^{-1/\pi}\sqrt[2\pi]{5\left(3+\sqrt{5}\right)\pi}\right)\sqrt[9]{\sqrt[3]{-\frac{1729}{2}+\sqrt{\frac{1729^2}{4}+\frac{4096^3}{27}}}-\sqrt[3]{-\frac{1729}{2}-\sqrt{\frac{1729^2}{4}+\frac{4096^3}{27}}}}\right)}$$

$$2^{-1/(2\pi)}\sqrt[18]{\sqrt[3]{\frac{\sqrt{\frac{274958621851}{3}}}{6}-\frac{1729}{2}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}}\sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi}$$

i.e.

2^(-1/(2π)) ((-1729/2+√(274958621851/3)/6)^(1/3)+(1729/2 + √(274958621851/3)/6)^(1/3))^(1/18) (5(3+√(5)) π)^(1/(4π))

= 1.61549140391…. result that is a very good approximation to the value of the golden ratio 1.618033988749… (Ramanujan Recurring Number)

And also:

From the exact result. After some easy calcularions:

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}} \sqrt[12]{5\left(3+\sqrt{5}\right)\pi}$$

i.e.

2^(-1/(2π)) ((-1729/2+√(274958621851/3)/6)^(1/3)+(1729/2 + √(274958621851/3)/6)^(1/3))^(1/18) (5(3+√(5)) π)^(1/12)

Input

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}} \sqrt[12]{5\left(3+\sqrt{5}\right)\pi}$$

Decimal approximation

1.6424705710870508525615245277435180276121229906618500231740721164
…

1.64247057108….≈ ζ(2) = $\pi^2/6$ = 1.644934 (trace of the instanton shape and Ramanujan Recurring Number)

Alternate forms

$$\frac{1}{\sqrt[27]{3}} 2^{-1/54-1/(2\pi)} \sqrt[18]{\sqrt[3]{\sqrt{824875865553}-15561}+\sqrt[3]{15561+\sqrt{824875865553}}}\ \sqrt[12]{5\left(3+\sqrt{5}\right)\pi}$$

$$\frac{1}{\sqrt[54]{3}} 2^{-1/54-1/(2\pi)} \sqrt[18]{\sqrt[3]{\sqrt{\frac{274958621851}{3}}-5187}+\sqrt[3]{5187+\sqrt{\frac{274958621851}{3}}}}\ \sqrt[12]{\left(15+5\sqrt{5}\right)\pi}$$

$$\left(2^{-1/36-1/(2\pi)} \sqrt[12]{\left(15+5\sqrt{5}\right)\pi}\right)\Big/\left(\left(3\Big/\left(16384+2^{2/3}\sqrt[3]{137519668379-5187\sqrt{824875865553}}+2^{2/3}\sqrt[3]{137519668379+5187\sqrt{824875865553}}\right)\right)\hat{}\,(1/36)\right)$$

Series representations

$$2^{-1/(2\pi)}\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}}\;\sqrt[12]{5\left(3+\sqrt{5}\right)\pi}=\frac{1}{\sqrt[54]{3}}\,2^{-1/54-1/(2\pi)}\sqrt[12]{5}\,\sqrt[12]{\pi\left(3+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}\left(\sqrt[3]{-5187+\sqrt{\frac{274\,958\,621\,848}{3}}\sum_{k=0}^{\infty}\left(\frac{274\,958\,621\,848}{3}\right)^{-k}\binom{\frac{1}{2}}{k}}+\sqrt[3]{5187+\sqrt{\frac{274\,958\,621\,848}{3}}\sum_{k=0}^{\infty}\left(\frac{274\,958\,621\,848}{3}\right)^{-k}\binom{\frac{1}{2}}{k}}\right){}^{\wedge}\,(1/18)$$

$$2^{-1/(2\pi)}\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}}\;\sqrt[12]{5\left(3+\sqrt{5}\right)\pi}=\frac{1}{\sqrt[54]{3}}\,2^{-1/54-1/(2\pi)}\sqrt[12]{5}\,\sqrt[12]{\pi\left(3+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)}\left(\sqrt[3]{-5187+\sqrt{\frac{274\,958\,621\,848}{3}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274\,958\,621\,848}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}+\sqrt[3]{5187+\sqrt{\frac{274\,958\,621\,848}{3}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274\,958\,621\,848}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}\right){}^{\wedge}\,(1/18)$$

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2} + \frac{\sqrt{\frac{274958621851}{3}}}{6}} + \sqrt[3]{\frac{1729}{2} + \frac{\sqrt{\frac{274958621851}{3}}}{6}}}$$

$$\sqrt[12]{5\left(3+\sqrt{5}\right)\pi} =$$

$$\frac{1}{\sqrt[54]{3}}\, 2^{-1/54-1/(2\pi)}\, \sqrt[12]{5}\, \sqrt[12]{\pi\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)}$$

$$\left(\sqrt[3]{-5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k \left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}} + \right.$$

$$\left.\sqrt[3]{5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k \left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}}\right)\hat{}\,(1/18)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

Alternate forms

$$\frac{1}{\sqrt[27]{3}} 2^{-1/54-1/(2\pi)}$$

$$\sqrt[18]{\sqrt[3]{\sqrt{824875865553} - 15561} + \sqrt[3]{15561 + \sqrt{824875865553}}}\ \sqrt[12]{5\left(3+\sqrt{5}\right)\pi}$$

$$\frac{1}{\sqrt[54]{3}}\, 2^{-1/54-1/(2\pi)} \sqrt[18]{\sqrt[3]{\sqrt{\frac{274958621851}{3}} - 5187} + \sqrt[3]{5187 + \sqrt{\frac{274958621851}{3}}}} \sqrt[12]{\left(15 + 5\sqrt{5}\right)\pi}$$

$$\left(2^{-1/36-1/(2\pi)} \sqrt[12]{\left(15 + 5\sqrt{5}\right)\pi}\right) \Big/ \left(\left(3 \Big/ \left(16384 + 2^{2/3} \sqrt[3]{137519668379 - 5187\sqrt{824875865553}} + 2^{2/3} \sqrt[3]{137519668379 + 5187\sqrt{824875865553}}\right)\right) \hat{}\ (1/36)\right)$$

Series representations

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2} + \frac{\sqrt{\frac{274958621851}{3}}}{6}} + \sqrt[3]{\frac{1729}{2} + \frac{\sqrt{\frac{274958621851}{3}}}{6}}} \sqrt[12]{5\left(3 + \sqrt{5}\right)\pi} = \frac{1}{\sqrt[54]{3}}\, 2^{-1/54-1/(2\pi)} \sqrt[12]{5} \sqrt[12]{\pi\left(3 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k}\right)} \left(\sqrt[3]{-5187 + \sqrt{\frac{274958621848}{3}} \sum_{k=0}^{\infty} \left(\frac{274958621848}{3}\right)^{-k} \binom{\frac{1}{2}}{k}} + \sqrt[3]{5187 + \sqrt{\frac{274958621848}{3}} \sum_{k=0}^{\infty} \left(\frac{274958621848}{3}\right)^{-k} \binom{\frac{1}{2}}{k}}\right) \hat{}\ (1/18)$$

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}}\ \sqrt[12]{5\left(3+\sqrt{5}\right)\pi} = \frac{1}{\sqrt[54]{3}}\ 2^{-1/54-1/(2\pi)}\ \sqrt[12]{5}\ \sqrt[12]{\pi\left(3+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)} \left(\sqrt[3]{-5187+\sqrt{\frac{274958621848}{3}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274958621848}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+\sqrt[3]{5187+\sqrt{\frac{274958621848}{3}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274958621848}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right){}^\wedge(1/18)$$

$$2^{-1/(2\pi)} \sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}}\ \sqrt[12]{5\left(3+\sqrt{5}\right)\pi} = \frac{1}{\sqrt[54]{3}}\ 2^{-1/54-1/(2\pi)}\ \sqrt[12]{5}\ \sqrt[12]{\pi\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5-z_0\right)^k z_0^{-k}}{k!}\right)} \left(\sqrt[3]{-5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}}+\sqrt[3]{5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}}\right){}^\wedge(1/18)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

We note that:

(2^(-1/(2π)) ((-1729/2+√(274958621851/3)/6)^(1/3)+(1729/2 + √(274958621851/3)/6)^(1/3))^(1/18) (5(3+√(5)) π)^(1/(4π)))*1/10^35+Pi/4096*1/10^35

Input

$$\left(2^{-1/(2\pi)}\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}}\;\sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi}\right)\times\frac{1}{10^{35}}+\frac{\pi}{4096}\times\frac{1}{10^{35}}$$

Exact result

$$\frac{\pi}{409600000000000000000000000000000000000}+2^{-35-1/(2\pi)}\times 5^{1/(4\pi)-35}\sqrt[18]{\sqrt[3]{\frac{\sqrt{\frac{274958621851}{3}}}{6}-\frac{1729}{2}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}}\;\sqrt[4\pi]{\left(3+\sqrt{5}\right)\pi}$$

Decimal approximation

$1.6162583943064619468439112995703341118649643385080988454971\ldots\times 10^{-35}$

$1.616258394306\ldots*10^{-35} \approx 1.616255*10^{-35}$ (Planck Length)

Alternate forms

$$\frac{\pi + \frac{2^{647/54-1/(2\pi)} \sqrt[18]{\sqrt[3]{\sqrt{\frac{274\,958\,621\,851}{3}} - 5187} + \sqrt[3]{5187 + \sqrt{\frac{274\,958\,621\,851}{3}}}} \sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi}}{\sqrt[54]{3}}}{409\,600\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

$$\frac{\pi}{409\,600\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{1}{\sqrt[27]{3}} 2^{-1891/54-1/(2\pi)} \times$$
$$5^{1/(4\pi)-35} \sqrt[18]{\sqrt[3]{\sqrt{824\,875\,865\,553} - 15\,561} + \sqrt[3]{15\,561 + \sqrt{824\,875\,865\,553}}}$$
$$\sqrt[4\pi]{\left(3+\sqrt{5}\right)\pi}$$

$$\frac{\pi}{409\,600\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{1}{\sqrt[54]{3}} 2^{-1891/54-1/(2\pi)} \times$$
$$5^{1/(4\pi)-35} \sqrt[18]{\sqrt[3]{\sqrt{\frac{274\,958\,621\,851}{3}} - 5187} + \sqrt[3]{5187 + \sqrt{\frac{274\,958\,621\,851}{3}}}}$$
$$\sqrt[4\pi]{\left(3+\sqrt{5}\right)\pi}$$

Series representations

$$\frac{1}{10^{35}} 2^{-1/(2\pi)} \left(\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}} \sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi} \right) + \frac{\pi}{10^{35} \times 4096} =$$

$$\left(2^{-47-1/(2\pi)} \left(3 \sqrt[2\pi]{2}\, \pi + 2048 \sqrt[4\pi]{5}\; 6^{53/54} \sqrt[4\pi]{\pi \left(3+\sqrt{4} \sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k}\right)} \left(\sqrt[3]{-5187+\sqrt{\frac{274958621848}{3}} \sum_{k=0}^{\infty} \left(\frac{274958621848}{3}\right)^{-k} \binom{\frac{1}{2}}{k}} + \sqrt[3]{5187+\sqrt{\frac{274958621848}{3}} \sum_{k=0}^{\infty} \left(\frac{274958621848}{3}\right)^{-k} \binom{\frac{1}{2}}{k}}\right)^{\wedge} (1/18)\right)\right) \Big/ 8731149137020111083984375$$

$$\frac{1}{10^{35}} 2^{-1/(2\pi)} \left(\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}+\sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274\,958\,621\,851}{3}}}{6}}} \right.$$

$$\left. \sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi} \right) + \frac{\pi}{10^{35}\times 4096} =$$

$$\left(2^{-47-1/(2\pi)}\left(3\sqrt[2\pi]{2}\;\pi+2048\sqrt[4\pi]{5}\;6^{53/54}\sqrt[4\pi]{\pi\left(3+\sqrt{4}\;\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)}\right.\right.$$

$$\left(\sqrt[3]{-5187+\sqrt{\frac{274\,958\,621\,848}{3}}\;\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274\,958\,621\,848}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}+\right.$$

$$\left.\sqrt[3]{5187+\sqrt{\frac{274\,958\,621\,848}{3}}\;\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{274\,958\,621\,848}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}\right)^{\wedge}$$

$$\left.\left.(1/18)\right)\right)\Big/ 8\,731\,149\,137\,020\,111\,083\,984\,375$$

$$\frac{1}{10^{35}} 2^{-1/(2\pi)} \left(\sqrt[18]{\sqrt[3]{-\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}} + \sqrt[3]{\frac{1729}{2}+\frac{\sqrt{\frac{274958621851}{3}}}{6}}} \sqrt[4\pi]{5\left(3+\sqrt{5}\right)\pi} \right) + \frac{\pi}{10^{35}\times 4096} = \left(2^{-47-1/(2\pi)} \left(3\sqrt[2\pi]{2}\,\pi + 2048\sqrt[4\pi]{5}\; 6^{53/54} \sqrt[4\pi]{\pi\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)} \left(\sqrt[3]{-5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}} + \sqrt[3]{5187+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{274958621851}{3}-z_0\right)^k z_0^{-k}}{k!}}\right)^\wedge (1/18)\right)\right) \Big/ 8731149137020111083984375$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

The general "unitary" formula, which derives from DN Constant, is the following:

$$\sqrt{2 \times \frac{2 \cdot \sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi \cdot 0.9991104684}\left(C \times \mathrm{R} \times 2.33 \cdot 10^{-13}\right)}} \cong 1.61803398\ldots = \frac{\sqrt{5}+1}{2}$$

Where $\frac{2\sqrt{2}}{\pi}$ is the Del Gaudio-Nardelli Constant, 0.9991104684 is the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

C is any constant or solution to an equation, R is the radius of the Universe and $2.33*10^{-13}$ is the temperature of the universe expressed in GeV.

From the previous result, for $C = 9.9128$, inserting a radius of the Universe, which we have calculated, equal to $\mathrm{R} = 2.06274*10^{12}$ years, from DN Constant "unitary" formula, we obtain:

√(2×(2·(((2√2)/π))^(1/16))/(1/(π·0.9991104684) (9.9128×(2.06274 × 10^12)×2.33·10^(-13))))

Input interpretation

$$\sqrt{2\times\frac{2\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi\times 0.9991104684}\times\frac{9.9128\times 2.06274\times 10^{12}\times 2.33}{10^{13}}}}$$

Result

1.6180359123482642354401744088347098542545273508401733563064818107

...

1.618035912348…. result that is a very good approximation to the value of the golden ratio 1.618033988749… (Ramanujan Recurring Number)

And, always from:

$$\sqrt{2\times\frac{2\cdot\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi\cdot 0.9991104684}(1.616255\cdot 10^{-35}\times R\times 2.33\cdot 10^{-13})}}$$

for C = 1.616255*10^{-35} (Planck Length), R = 1.265120782997423× 10^{48} that is equal to the radius of the Multiverse and 2.33*10^{-13} is the mean temperature of the CMB is equivalent around to *2.73 Kelvin* , we obtain:

$$\sqrt{2 \times \frac{2 \cdot \sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi \cdot 0.9991104684}(1.616255 \cdot 10^{-35} \times 1.265120782997423 * 10^{48} \times 2.33 \cdot 10^{-13})}} =$$

√(2×(2·(((2√2)/π)^(1/16)))/(1/(π·0.9991104684)(1.616255·10^(-35)×1.265120782997423*10^48×2.33·10^(-13))))

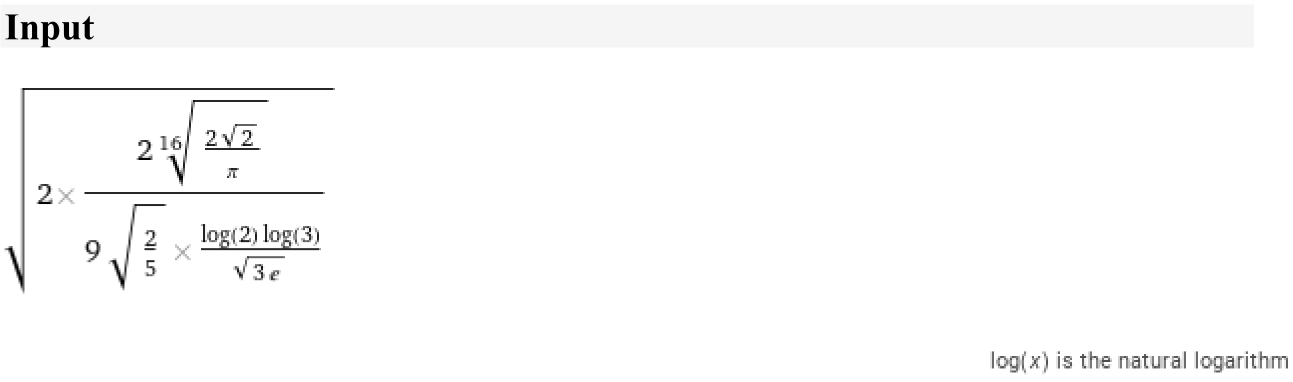
Where $1.616255*10^{-35}$ = Planck Length ; $1.265120782997423 * 10^{48}$ = radius of Multiverse ; $2.33*10^{-13}$ = mean temperature of the CMB

$$= \sqrt{2 \times \frac{2 \cdot \sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{(4.7642856533177547923l545)}{\pi \cdot 0.9991104684}}} = \sqrt{2 \times \frac{2 \cdot \sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{1.517869417}} = \sqrt{2 \times \frac{2 \cdot \sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{9\sqrt{\frac{2}{5}}0.414293^{\frac{3}{2}}}} =$$

1.618033719519….

Indeed:

√(2×(2·((2√2)/π)^1/16)/(9√(2/5)(log2 log3)/√(3e)))



Input

$$\sqrt{2 \times \frac{2\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{9\sqrt{\frac{2}{5}} \times \frac{\log(2)\log(3)}{\sqrt{3e}}}}$$

log(x) is the natural logarithm

Exact result

$$\frac{2^{51/64}\sqrt[4]{5\,e}}{3^{3/4}\sqrt[32]{\pi}\sqrt{\log(2)\log(3)}}$$

Decimal approximation

1.6180337195191494694592859877088514992174074748460976388126912571

...

1.618033719519…. result that is a very good approximation to the value of the golden ratio 1.618033988749… (Ramanujan Recurring Number)

We obtain also

(√(2×(2·(((2√2)/π))^(1/16))/(1/(π·0.9991104684) (9.9128×(2.06274 × 10^12)×2.33·10^(-13)))))dxdydz

Indefinite integral assuming all variables are real

$0.809018\,x^2\,y\,z$ + constant

Definite integral over a cube of edge length 2 L

$$\int_{-L}^{L}\int_{-L}^{L}\int_{-L}^{L} 1.61804 \, dx \, dy \, dz = 12.9443 \, L^3$$

Definite integral over a sphere of radius R

$$\iiint\limits_{x^2+y^2+z^2<R^2} 1.61804 \, dz \, dy \, dx = 6.77761 \, R^3$$

From which, for L = R = 1 , dividing the two definite integral results by the original expression, we obtain:

12.9443/(√(2×(2·(((2√2)/π))^(1/16))/(1/(π·0.9991104684) (9.9128×(2.06274 × 10^12)×2.33·10^(-13)))))

Input interpretation

$$\frac{12.9443}{\sqrt{2\times\frac{2\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi\times0.9991104684}\times\frac{9.9128\times2.06274\times10^{12}\times2.33}{10^{13}}}}}$$

Result

8.00001…

8.00001….

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

3*((12.9443/(√(2×(2·(((2√2)/π))^(1/16))/(1/(π·0.9991104684) (9.9128×(2.06274 × 10^12)×2.33·10^(-13)))))))

Input interpretation

$$3\times\frac{12.9443}{\sqrt{2\times\frac{2\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi\times0.9991104684}\times\frac{9.9128\times2.06274\times10^{12}\times2.33}{10^{13}}}}}$$

Result

24.0000…

24

The value 24 is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string representing a bosons. From the analysis, we observe that the is no number theoretic connection with physical vibrations of fermionic strings at extremally low entropy. This fact is confirmed by the fact that the Higgs bosons at the moment of the big bang and infinitesimally shortly thereafter, facilitated the creation of fermions (matter and antimatter particles). Thus we note that the ingredients for the formation of electromagnetic radiation from photons (a Boson), and the formation of matter from the Higgs boson after the big bang, are intrinsic properties of the vacuum energy in pre-big bang.

And again:

3*(6.77761/(√(2×(2·(((2√2)/π))^(1/16))/(1/(π·0.9991104684) (9.9128×(2.06274 × 10^12)×2.33·10^(-13))))))

Input interpretation

$$3\times\frac{6.77761}{\sqrt{2\times\frac{2\sqrt[16]{\frac{2\sqrt{2}}{\pi}}}{\frac{1}{\pi\times0.9991104684}\times\frac{9.9128\times2.06274\times10^{12}\times2.33}{10^{13}}}}}$$

Result

12.5664…

12.5664…≈ 4π ≈ S_{BH} - Bekenstein-Hawking Black Hole Entropy

Observations with regard “On the same origin of quantum physics and general relativity from Riemannian geometry and Planck scale formalism”

https://www.researchgate.net/publication/379310936_

Very interesting is that has been “modeled the universe using the equation with Einstein’s lambda formalism and found that the universe dynamics could be considered as harmonic oscillators entangled with lambda curvature”. Furthermore, “this equation can be used to describe the energy transfer between two entangled spacetimes between the same universe and between any two universes (ER=EPR)”. And very interesting is also that “the singularity of black holes can be avoided at the Planck scale, because space and time are no longer entangled”.

The originality, the goal, in my opinion, lies in the fact that "the constants of the universe can be reduced to just two quantities: Planck length and Planck time" and in having demonstrated that "the Einstein field equation of general relativity is actually a relativistic quantum mechanical equation".

The authors' thesis, in my humble opinion, is very valid and coherent from a physical and mathematical point of view. Furthermore:

We observe that:

$$\frac{\varepsilon^2}{\varepsilon_p^2} = l_p^2(R^2 + \Lambda^2)$$

$$= l_p^2(\cos^2 \omega\tau + \sin^2 \omega\tau) = l_p^2$$

and, we note that:

$$l_p^2 = \left(\sqrt{\frac{\hbar G}{c^3}}\right)^2$$

that is equal to

(√(ℏG/c^3))^2

Input interpretation

$\sqrt{(G\hbar/c^3}$ (Newtonian gravitational constant reduced Planck constant per speed of light cubed)$)^2$

Result

$2.612\times10^{-70}\ \text{m}^2$ (square meters)

$2.612*10^{-70}$ m^2

Now, we perform the following calculation

(-ln(2.612×10^-70)-4^2)

(String Theory, Superstring Theory and Beyond – Vol. II – J. Polchinski)

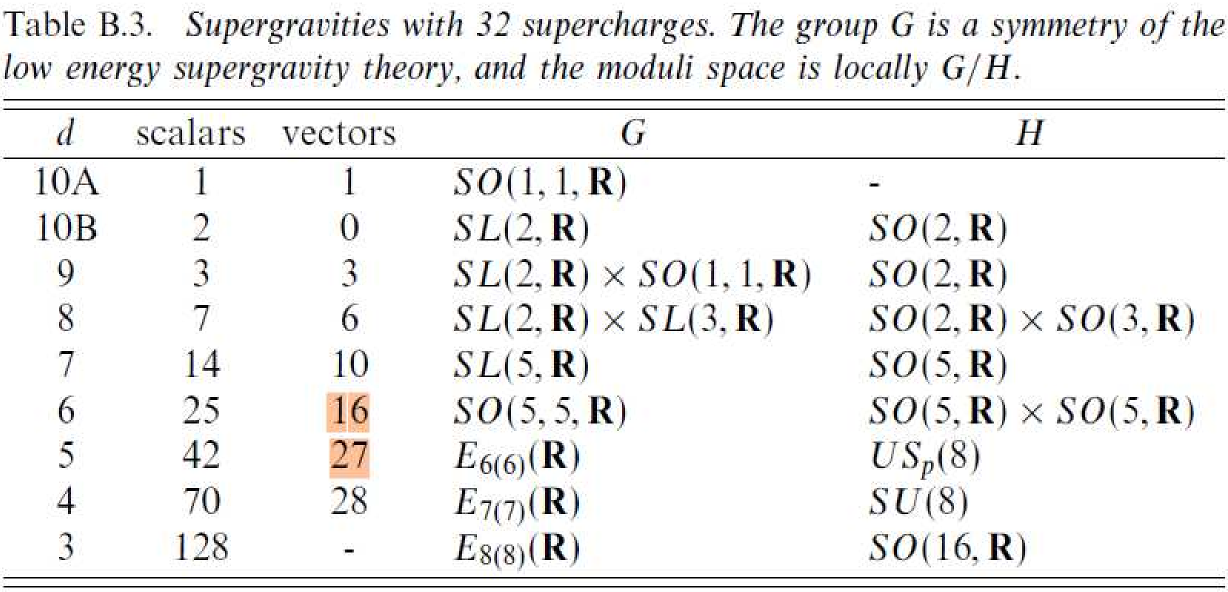


Table B.3. *Supergravities with 32 supercharges. The group G is a symmetry of the low energy supergravity theory, and the moduli space is locally G/H.*

d	scalars	vectors	G	H
10A	1	1	$SO(1,1,\mathbf{R})$	-
10B	2	0	$SL(2,\mathbf{R})$	$SO(2,\mathbf{R})$
9	3	3	$SL(2,\mathbf{R})\times SO(1,1,\mathbf{R})$	$SO(2,\mathbf{R})$
8	7	6	$SL(2,\mathbf{R})\times SL(3,\mathbf{R})$	$SO(2,\mathbf{R})\times SO(3,\mathbf{R})$
7	14	10	$SL(5,\mathbf{R})$	$SO(5,\mathbf{R})$
6	25	16	$SO(5,5,\mathbf{R})$	$SO(5,\mathbf{R})\times SO(5,\mathbf{R})$
5	42	27	$E_{6(6)}(\mathbf{R})$	$USp(8)$
4	70	28	$E_{7(7)}(\mathbf{R})$	$SU(8)$
3	128	-	$E_{8(8)}(\mathbf{R})$	$SO(16,\mathbf{R})$

Where 16 = 4^2 are vectors (see above Table) and 233 is a Fibonacci's number and the difference between 248 and 15.

There is a group, the exceptional group $E8$, that has an $SO(16)$ subgroup under which the E adjoint **248** transforms as **120** + **128**. The total matter central charge is $c^{\mathrm{m}} = \tilde{c}^{\,m} = 15$. Thence, we obtain:

233/(-ln(2.612×10^-70)-4^2)

Input interpretation

$$\frac{233}{-\log\left(2.612\times 10^{-70}\right)-4^2}$$

log(x) is the natural logarithm

Result

1.6155779...

1.6155779…a result very near to the value of the Golden Ratio.

Furthermore, with regard the Planck time

$$t_p = \left(\sqrt{\frac{\hbar G}{c^5}}\right)$$

we obtain:

(√(ℏG/c^5))

Input interpretation

$\sqrt{(}G\hbar/c^5$ (Newtonian gravitational constant reduced Planck constant per speed of light to the fifth))

Result

5.391×10^{-44} seconds

$5.391*10^{-44}$ s

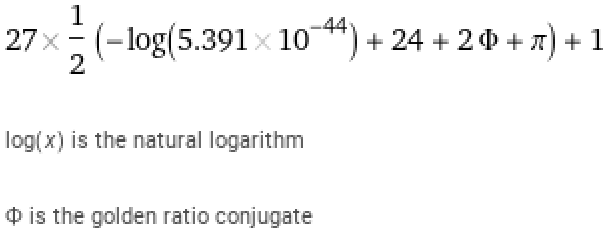
And performing the following calculations:

27*1/2(-ln(5.391×10^-44)+24+2Φ+Pi)+1

Where 27 are vectors (see above table) and 24 is the number of vibration modes of the bosonic strings

we obtain:

Input interpretation



$$27\times\frac{1}{2}\left(-\log\left(5.391\times10^{-44}\right)+24+2\,\Phi+\pi\right)+1$$

log(x) is the natural logarithm

Φ is the golden ratio conjugate

Result

1729.0901…

1729.0901….

1728 (1729 - 1) occurs in the algebraic formula for the j-invariant of an elliptic curve (1728 = $8^2 * 3^3$). Furthermore, the number 1729 is the Hardy–Ramanujan number (taxicab number, as it can be expressed as the sum of two cubes in two different ways ($10^3 + 9^3 = 12^3 + 1^3 = 1729$) and Ramanujan's recurring number)

(1/2(-ln(5.391×10^-44)+24+2Φ+Pi))^2-2/5

Input interpretation

$$\left(\frac{1}{2}\left(-\log\left(5.391\times 10^{-44}\right)+24+2\Phi+\pi\right)\right)^2-\frac{2}{5}$$

log(x) is the natural logarithm

Φ is the golden ratio conjugate

Result

4096.0271…

4096.0271…. ≈ 4096 = 64^2, (Ramanujan Recurring Number) that multiplied by 2 give 8192, indeed:

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group. The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: “Dilaton Tadpole for the Open Bosonic String “ Michael R. Douglas and Benjamin Grinstein - September 2,1986)

And:

(27*1/2(-ln(5.391×10^-44)+24+2Φ+Pi)+1)^1/15+(MRB const)^(1-1/(4π)+π)

Input interpretation

$$\sqrt[15]{27\times\frac{1}{2}\left(-\log\left(5.391\times 10^{-44}\right)+24+2\Phi+\pi\right)+1}+C_{\mathrm{MRB}}^{1-1/(4\pi)+\pi}$$

log(x) is the natural logarithm

Φ is the golden ratio conjugate

C_{MRB} is the MRB constant

Result

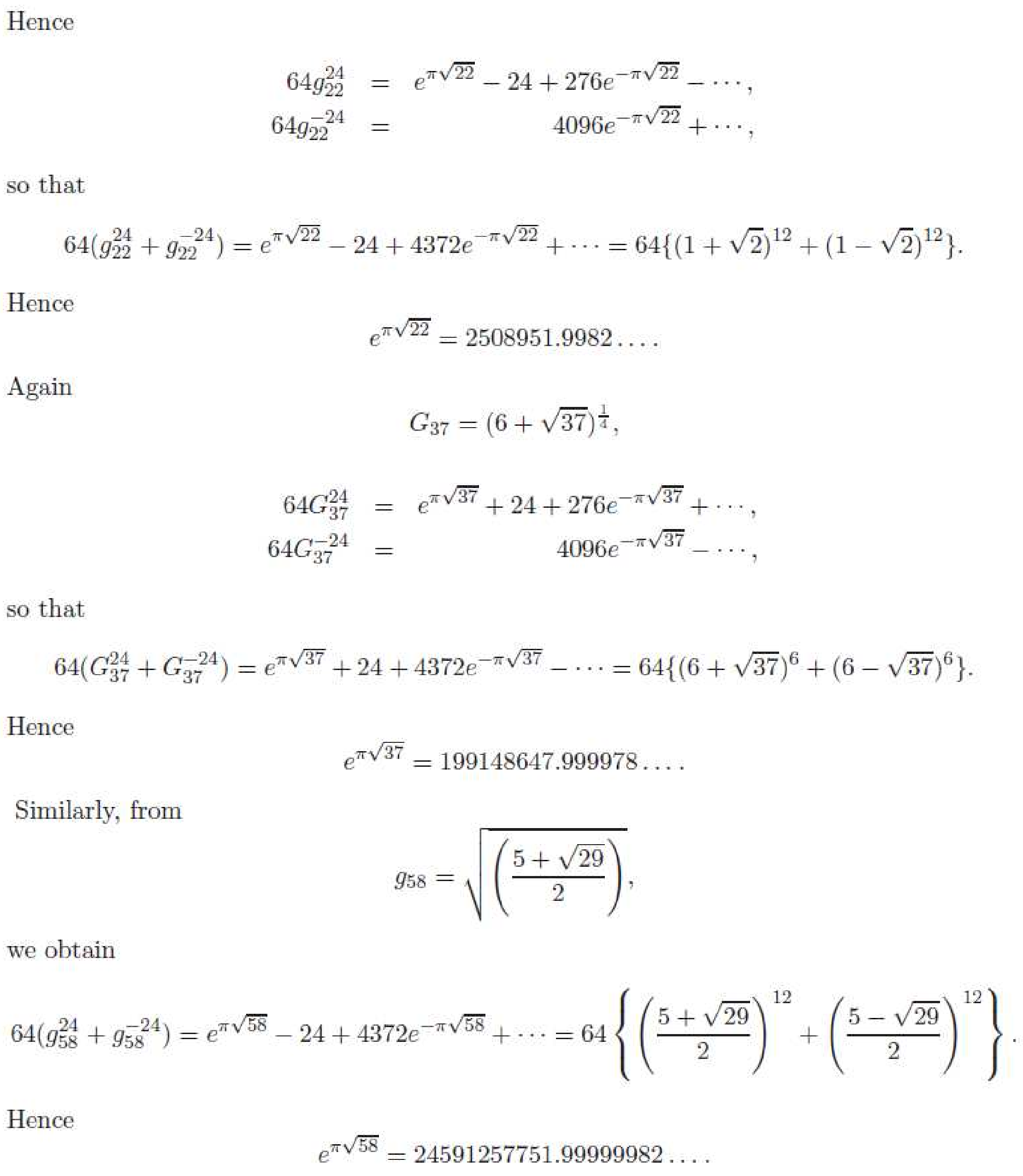
1.64494373…

1.64494373…. ≈ ζ(2) = $\pi^2/6$ = 1.644934 (trace of the instanton shape and Ramanujan Recurring Number)

From:

Modular equations and approximations to π - *Srinivasa Ramanujan* - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:



Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^6 + (6-\sqrt{37})^6\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

We note that, with regard 4372, we can to obtain the following results:

27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023…

1729.0526944….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. ($1728 = 8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}$$

Minimal polynomial

$$\begin{aligned}&256x^8+95\,744x^7-3\,248\,750\,080x^6-\\&\quad 914\,210\,725\,504x^5+15\,498\,355\,554\,921\,184x^4+\\&\quad 2\,911\,478\,392\,539\,914\,656x^3-32\,941\,144\,911\,224\,677\,091\,680x^2-\\&\quad 3\,092\,528\,914\,069\,760\,354\,714\,456x+26\,320\,050\,609\,744\,039\,027\,169\,013\,041\end{aligned}$$

Expanded forms

$$-\frac{187}{4}+\frac{29\sqrt{5}}{4}+54\sqrt{1093}-\frac{27}{8}\sqrt{10-2\sqrt{5}}-\frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}$$

$$-\frac{107}{2}+\frac{\sqrt{5}}{2}+54\sqrt{1093}+\frac{27}{\sqrt{5}-1}-\frac{27\sqrt{10-2\sqrt{5}}}{2\left(\sqrt{5}-1\right)}$$

Series representations

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$
$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+2\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Bigg/\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$
$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Bigg/$$
$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$
$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-$$
$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/$$
$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Or:

27((4096+276)^1/2-2-1/2(((√(10-2√5) -2))/((√5-1))))+φ

Input

$$27\left(\sqrt{4096+276}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023

…

1729.0526944…. as above

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}$$

Minimal polynomial

$$256x^8+95\,744x^7-3\,248\,750\,080x^6-914\,210\,725\,504x^5+15\,498\,355\,554\,921\,184x^4+2\,911\,478\,392\,539\,914\,656x^3-32\,941\,144\,911\,224\,677\,091\,680x^2-3\,092\,528\,914\,069\,760\,354\,714\,456x+26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4}+\frac{29\sqrt{5}}{4}+54\sqrt{1093}-\frac{27}{8}\sqrt{10-2\sqrt{5}}-\frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}$$

.

$$-\frac{107}{2}+\frac{\sqrt{5}}{2}+54\sqrt{1093}+\frac{27}{\sqrt{5}-1}-\frac{27\sqrt{10-2\sqrt{5}}}{2\left(\sqrt{5}-1\right)}$$

Series representations

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$
$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+2\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Bigg/\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

.

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$
$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Bigg/$$
$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

.

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$
$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-$$
$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$
$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

(27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ)^1/15

Input

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi}$$

ϕ is the golden ratio

Exact result

$$\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}$$

Decimal approximation

1.6438185685849862799902301317036810054185756873505184804834183124
…

$1.64381856858\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms

$$\sqrt[15]{\phi - 54 + 54\sqrt{1093} - \frac{27\left(\sqrt{10 - 2\sqrt{5}} - 2\right)}{2\left(\sqrt{5} - 1\right)}}$$

.

$$\frac{1}{\sqrt[15]{\frac{2\left(\sqrt{5}-1\right)}{166-108\sqrt{5}-108\sqrt{1093}+108\sqrt{5465}-27\sqrt{2\left(5-\sqrt{5}\right)}}}}$$

.

$$\sqrt[15]{\boxed{\begin{array}{l}\text{root of } 256x^8 + 95\,744x^7 - 3\,248\,750\,080x^6 - 914\,210\,725\,504x^5 + \\ \quad 15\,498\,355\,554\,921\,184x^4 + 2\,911\,478\,392\,539\,914\,656x^3 - \\ \quad 32\,941\,144\,911\,224\,677\,091\,680x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456x + \\ \quad 26\,320\,050\,609\,744\,039\,027\,169\,013\,041 \text{ near } x = 1729.05\end{array}}}$$

Minimal polynomial

$$\begin{aligned}&256x^{120} + 95\,744x^{105} - 3\,248\,750\,080x^{90} - \\ &\quad 914\,210\,725\,504x^{75} + 15\,498\,355\,554\,921\,184x^{60} + \\ &\quad 2\,911\,478\,392\,539\,914\,656x^{45} - 32\,941\,144\,911\,224\,677\,091\,680x^{30} - \\ &\quad 3\,092\,528\,914\,069\,760\,354\,714\,456x^{15} + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041\end{aligned}$$

Expanded forms

$$\sqrt[15]{\frac{1}{2}\left(1 + \sqrt{5}\right) + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{2\left(\sqrt{5} - 1\right)}\right)}$$

.

$$\sqrt[15]{-\frac{187}{4}+\frac{29\sqrt{5}}{4}+54\sqrt{1093}-\frac{27}{8}\sqrt{10-2\sqrt{5}}-\frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}}$$

All 15th roots of ϕ + 27 (-2 + 2 sqrt(1093) - (sqrt(10 - 2 sqrt(5)) - 2)/(2 (sqrt(5) - 1)))

$$e^{0}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.64382 \text{ (real, principal root)}$$

$$e^{(2i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.50170+0.6686\,i$$

$$e^{(4i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.0999+1.2216\,i$$

$$e^{(2i\pi)/5}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 0.5080+1.5634\,i$$

$$e^{(8i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx -0.17183+1.63481\,i$$

Series representations

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} = \frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+2\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right){}^\wedge(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} = \frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right){}^\wedge(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.\right.\right.$$

$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$

$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-$$

$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left.\left.\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\hat{}\,(1/15)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Integral representation

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\mathrm{Re}(a) \text{ and } |\arg(z)|<\pi)$$

From:

An Update on Brane Supersymmetry Breaking - *J. Mourad and A. Sagnotti* - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\,e^{\gamma_E\,\phi} \;=\; -\,\frac{\beta_E^{(p)}\,h^2}{\gamma_E}\;e^{-\,2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

$$16\,k'\,e^{-\,2\,C} \;=\; \frac{h^2\left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-\,2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;=\; k\,e^{-\,2\,A}\;+\;\frac{h^2}{16(p\,+\,1)}\left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)\,e^{-\,2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\,e^{-\pi\sqrt{18}}$ instead of

$$e^{-\,2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016... \times 10^{-6}$

$1.6272016... * 10^{-6}$

Property:

$e^{-3\sqrt{2}\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10^{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

and:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\ e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625}e^{-6C+\phi}=\frac{1}{0.000244140625}e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi}=0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141}=4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141}=4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141}=4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

= 0.00666501785…

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

−5.010882647757...

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t} \, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757\ldots$$

and for C = 1, we obtain:

$$\phi = -5.010882647757 + 6 = 0.989117352243 = \boldsymbol{\phi}$$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1 + \sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}} - 1}} - \varphi + 1} = 1 - \cfrac{e^{-\pi\sqrt{5}}}{1 + \cfrac{e^{-2\pi\sqrt{5}}}{1 + \cfrac{e^{-3\pi\sqrt{5}}}{1 + \cfrac{e^{-4\pi\sqrt{5}}}{1 + \ldots}}}} \approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value 0.989117352243 = $\boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

On Srinivasa Ramanujan's Mathematics and a Possible Unitary Mathematical Model

In practice, the intuition is this: all geometric shapes in the microcosm and macrocosm have a "trace", a "signature". It is mainly identified with π and φ (the golden section). The constant DN $(2\sqrt{2})/\pi$ unifies the various mathematical constants, certainly the fundamental ones and is also connected to the Planck length and the Planck mass. This is why Ramanujan studied π so much, this is why I consider his work "Modular equations and approximations to π" of fundamental importance. From π and φ and the connected constant DN, a multiverse emerges that is born from a white hole, through that cosmological process that goes under the name of eternal inflation. "Nothing is created, nothing is destroyed, everything is transformed". The Universe "is" has always existed, exists and will always exist. It only goes through "phases", "cycles" and the information cycle after cycle is not lost, but only reworked.

References

Modular equations and approximations to π - *Srinivasa Ramanujan* - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

An Update on Brane Supersymmetry Breaking - *J. Mourad and A. Sagnotti* - arXiv:1711.11494v1 [hep-th] 30 Nov 2017